

**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

1. (withdrawn): A process for manufacturing a zeolite membrane on the surface of a porous tubular support with both ends open, which comprises:

carrying out hydrothermal reaction of a reaction solution for zeolite synthesis which contains a silica source and an alumina source in a reaction container;

in which reaction container the porous tubular support is placed vertically by holding the porous tubular support with a holding member located at the top and/or bottom of the reaction container under conditions of being not contact with the inner surface of the reaction container and leaving the top and bottom ends of the porous tubular support open,

wherein the porous tubular support placed vertically is completely immersed in the reaction solution which fills the reaction container, and

wherein the reaction is induced by heating the reaction solution.

- 2-3. (canceled).

4. (withdrawn): The process for manufacturing a zeolite membrane according to claim 1, wherein the porous tubular support is placed at one per the reaction container.
5. (withdrawn): The process for manufacturing a zeolite membrane according to claim 1, wherein the reaction solution is heated in such a manner that the convection of the reaction solution occurs over the full length of the porous tubular support placed in the reaction container.
6. (canceled).
7. (withdrawn): The process for manufacturing a zeolite membrane according to claim 1, wherein the level of the reaction solution filled in the reaction container is 2 to 30 cm above the top of the porous tubular support placed vertically in the container and immersed in the solution.
8. (withdrawn): The process for manufacturing a zeolite membrane according to claim 1, wherein the distance from the inner surface of the reaction container to the outer surface of the porous tubular support placed is set to be 2 to 25 mm to carry out the reaction.
9. (withdrawn): The process for manufacturing a zeolite membrane according to claims 1, wherein a transparent solution with a turbidity of 300 NTU or less is prepared as the reaction

solution and wherein the reaction is carried out at a temperature within the range of from the boiling temperature to the temperature lower than the boiling temperature by 50

10. (withdrawn): The process for manufacturing a zeolite membrane according to claim 1, wherein the reaction solution is supplied to the reaction container at a temperature lower than 35°C and heated at a rate of 5 to 100°C/min in order to carry out the reaction.
11. (withdrawn): The process for manufacturing a zeolite membrane according to claim 1, wherein the reaction solution is provided as a suspension and the reaction is carried out at around the boiling temperature.
12. (canceled).
13. (withdrawn): An apparatus for manufacturing a zeolite membrane on the surface of a porous tubular support with both ends open, by hydrothermal reaction of a reaction solution for zeolite synthesis which contains a silica source and an alumina source, which comprises:
  - (a) a reaction container which accommodates the reaction solution, and has a sufficient shape and volume to place the whole of the porous tubular support therein and immerse it completely in the reaction solution received therein, under conditions that the

porous tubular support is not contact with the inner surface of the reaction container and leaves the top and bottom ends thereof open;

(b) a heating device for the reaction solution in the reaction container; and

(c) a holding device which holds the porous tubular support vertically in the reaction container under conditions of being not contact with the inner surface of the reaction container, and which is located at the top and/or bottom of the reaction container.

14. (withdrawn): The apparatus for manufacturing a zeolite membrane according to claim 13, wherein the holding device is located at the bottom of the reaction container, and has a structure on which the porous tubular support is placed vertically so that the bottom opening of the porous tubular support is not blocked up.

15. (withdrawn): The apparatus for manufacturing a zeolite membrane according to claim 13, wherein the distance from the inner surface of the reaction container to the outer surface of the porous tubular support placed therein is 2 to 25 mm.

16. (withdrawn): The apparatus for manufacturing a zeolite membrane according to claim 13, wherein the reaction container has

a height capable of providing conditions that the level of the reaction solution filled in the container is upper than the top of the porous tubular support immersed vertically in the reaction solution by 2 cm or more.

17. (canceled).

18. (currently amended): A zeolite tubular separation membrane comprising a porous tubular support with both ends open and a zeolite membrane which is formed on [[ the]] a surface of the porous tubular support, wherein zeolite single crystals exposed on the surface of the zeolite membrane each have a growth axis almost perpendicular to the surface of the porous tubular support, and wherein the membrane has grain boundary layers in spaces among the zeolite single crystals exposed on the surface of the zeolite membrane.

19. (canceled).

20. (currently amended): The zeolite tubular separation membrane according to claim 18 [[49]], wherein the grain boundary layers are 2 to 50 nm in thickness.

21-23. (canceled).

24. (withdrawn): The apparatus for manufacturing a zeolite membrane according to claim 13, wherein the heating device for the reaction is a heating jacket which is provided on the periphery of the reaction container and the inside of which a heating medium can be fed to.

25. (new): The zeolite tubular separation membrane according to claim 18, wherein the porous tubular support is 2 to 200 cm in length, 0.5 to 2 cm in inside diameter and 0.5 to 4 mm in thickness.

26. (new): The zeolite tubular separation membrane according to claim 25, wherein the grain boundary layers are 2 to 50 nm in thickness.